STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

29

COMMONWEALTH EDISON COMPANY	:	
	:	
Petition for approval of delivery services tariffs and tariff revisions and of residential delivery services implementation plan, and for approval of certain other amendments and additions to its rates, terms, and conditions	:	No. 01-0423

Surrebuttal Testimony of

CHRISTOPHER LEE CULP, PHD

Principal and Managing Director
CP Risk Management LLC

Q. Please state your name and business address.

A. My name is Christopher Lee Culp. The business address is 140 South Dearborn Street, Suite 1500, Chicago, Illinois.

Q. Are you the same Christopher Culp who previously filed direct and rebuttal testimony in this proceeding?

A. Yes.

Q. What is the purpose of your rebuttal testimony?

A. I will address some of the criticisms raised by Mr. Pregozen of my endorsement of ComEd's theoretical use of the Miller model. I will reiterate that my argument for the use of the model is not based on the realism of its assumptions but rather on its logical coherence, the straightforwardness of the means by which assumptions and outcomes are related to one another, and the widespread degree of the model's use in actual practice. I will also respond to some of the specific issues raised in a more narrow context by Mr. Pregozen.

Q. Please elaborate on what you meant in your testimony when you argued that models should be evaluated "based on their practical ability to describe actual behavior, not the realism of their assumptions."

A. A model should be chosen in the context of the present rate setting activity based on three criteria. First, a model should be logically coherent. If A implies B and B implies C, then A must imply C. Second, a model should be straightforward, which Mr. Pregozen has reminded us by way of a cite to the *American Heritage Dictionary* means that the model should not be circuitous, should be plain, and should be open. Logical coherence and

straightforwardness together imply that violations of the assumptions underlying the model should have predictable and clearly interpretable results.

Finally, a model should be widespread in its use—*i.e.,* consistent with actual behavior observed in the market by model users. Mr. Pregozen takes issue with my endorsement of the Miller/Hamada models based on the fact that they are the most widely used and straightforward, even taking the time to offer dictionary definitions for the differences in "straightforward" and "accurate."[1] I must say, however, that my use of the word "straightforward" was not an accident. To be quite clear, I do not believe the best way to choose an economic model is solely based on its predictive accuracy. "Actual behavior" is not synonymous with "predictive accuracy." "Actual behavior" means in large part "actual use."

One major reason to which I have testified already for choosing these criteria as the basis for endorsing the Miller model is that the combination of logical coherence, openness/straightforwardness, and widespread actual use make it hard to "tamper with" such models in order to get a result you want to get. The Miller/Hamada models were not chosen by ComEd because they yield a desirable result. They were chosen because they are logical, straightforward, and significantly used in practice. Indeed, given my testimony about the new risks to which ComEd is exposed, a cost of capital model based on an approach like value-at-risk likely would have yielded a much higher estimate. Yet, the value-at-risk approach to capital budgeting and cost of capital estimation is used at only a handful of firms and thus would not have been appropriate in this case.

[1] Staff Exhibit 26, pp.12-13.

Note that none of the criteria above allow us to assess the quality of a model purely based on the realism of the assumptions underlying that model. Numerous financial models like the family of term structure models (Vasicek; Brennan and Schwartz; Cox, Ingersoll, and Ross; etc.) have unrealistic assumptions underlying them, but they enjoy widespread practical application (*i.e.,* are adopted by practitioners in their actual behavior) anyway. This is in no small part due to their coherence and straightforwardness.

Q. Mr. Pregozen describes your view of choosing a model as a "devil you know" view.[2] Do you agree?

A. This is a misleading perspective of modeling because it implies that somewhere out there is a model that is *not* a devil. Yet, *all* models—both theoretical and econometric or statistical—are in the end an approximation of reality at least to some degree.

Q. How does Mr. Pregozen appear to be evaluating and choosing amongst models?

A. I am not certain. He states at one point that he opposes using the "ComEd Miller and Hamada models for the purpose of setting utility's cost of capital ... because the predictions of those models are so at variance with reality"[3] in the specific context of the model's implication for a 100% debt capital structure. He then also levels a series of criticisms at the Miller and Hamada models that are directed more at its assumptions than its predictive accuracy. These criticisms are summarized by his statement: "The ComEd Miller and Hamada models are clearly inaccurate *because they incorrectly assume* that

[2] Staff Exhibit 26, p.14.

[3] Staff Exhibit 26, p.6.

companies can borrow at the risk-free rate. [emphasis added]" [4] This implies that predictive accuracy is not the issue, but rather the "correctness" of the model's assumptions.

Q. Do you agree with him that the Miller model implies a 100% debt capital structure?

A. The fact that the M&M propositions with taxes can imply a 100% debt capital structure is well-known.[5] I do not disagree. But the existence of taxes is a violation of the M&M perfect capital markets assumption. Once perfect capital markets is violated as an assumption, however, other dimensions of that violation must be considered. For example, insolvency is costly. Mr. Pregozen argues at several points in his testimony that risky debt rates should be used in lieu of the risk free rate. And if the firm's debt is risky, then financial distress and insolvency must be a possibility.

Assuming distress is costly—the same imperfect capital markets world in which taxes exist—higher leverage raises a firm's expected financial distress costs. This attenuates the tax advantage of debt, thus implying a capital structure that is *not* 100% debt. The optimal capital structure of the firm that emerges under this limited set of assumptions is the leverage ratio that equates the tax benefit of debt to the financial distress cost of debt at the margin. Myers calls this the tradeoff theory of capital structure.[6,7]

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[4] Staff Exhibit 26, p.13.

[5] Miller, *op. cit.*, p. 112, and Franco Modigliani and Merton H. Miller, "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review* Vol. 53, No. 3 (June 1963).

[6] Stewart C. Myers, "The Capital Structure Puzzle," *Journal of Finance* Vol. 39, No. 3 (July 1984).

[7] Note that I am not endorsing this theory of optimal capital structure, but am merely stating the implications in response to Mr. Pregozen's question of the consistency in my line of reasoning.

Q. You place a lot of weight on the assessment of a model based on its ability to describe actual behavior, which you interpret in large part as widespread actual use. Do you have any evidence that the Miller and Hamada models are widespread in their practical use?

A. Surveys of how firms undertake capital budgeting decisions have been periodically undertaken and published in the academic literature, and these surveys provide confirmation of the degree to which the Miller/Hamada approach has been adopted.

An early survey by Schall, Sundem, and Geijsbeek of the senior financial officers at 189 responding firms sheds light on the applicability of the Miller and/or Hamada models in several ways.[8] 56% of the respondents use the net present value ("NPV") method for capital budgeting, and over 86% of respondents use either the NPV method or an internal rate of return ("IRR") method. Proper use of the NPV method involves discounting at WACC, and most IRR comparisons are made relative to WACC. Use of these methods thus is tantamount to indicating the use of WACC as a measure of a firm's cost of capital.

When asked about discounting explicitly, 46% of the respondents said they use WACC for discounting purposes, and 88% of the respondents made adjustments for taxes. Attempts by firms to classify themselves directly in risk classes were significantly less utilized; 77% of respondents did not rely on any risk class system of classification.

Q. How is the use of WACC support for the Miller/Hamada models?

[8] Lawrence D. Schall, Gary L. Sundem, and William R. Gleijsbeek, "Survey and Analysis of Capital Budgeting Methods," *Journal of Finance* Vol. 33, No. 1 (March 1978).

A. M&M Proposition II from which the Miller model is derived is essentially just a restatement of WACC. A firm that is discounting with WACC is almost certainly using the Miller adjustment.

Q. Is there any more recent evidence?

A. Yes, a similar study was undertaken by Graham and Harvey that was published in the past few months.[9] The sample included 392 financial executives from Fortune 500 firms, members of the Financial Executives Institute, or both. The results were similar to the earlier survey. 74.9% of the respondents always or almost always use the NPV method for capital budgeting, and 75.7% always or almost always use IRR. As noted, this implies the use of a WACC for discounting purposes.

73.5% of respondents in the Graham/Harvey survey use the CAPM to estimate their costs of equity capital. Because the Hamada model adjusts the CAPM for leverage, the use of the CAPM to get equity cost of capital estimates implies the use of the Hamada model to get WACC.

Q. In the survey evidence you cite, you claim that the use of the NPV models implies a WACC formulation and supports the use of the Miller/Hamada models. Because those models as published rely on the risk free rate, do you mean to say that these survey results tell us that all firms doing NPV analysis are using the risk free rate for their leverage adjustments?

A. There is no way to tell, but very likely they are not. Respondents may well be substituting in risky debt rates instead of the risk free rate.

[9] John R. Graham and Campbell R. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics* Vol. 61 (2001).

Q. Doesn't that mean they are not using the Miller or Hamada models?

A. Not at all. That means they are using the Miller/Hamada models with different inputs than prescribed by the original assumptions, presumably to address some of the known biases with which Mr. Pregozen is so concerned. Many financial models (such as the cost of carry model for forward prices and the binomial option pricing model) are derived and expressed in terms of the risk free rate, but a firm's actual borrowing rate is used to do the estimation.

Q. In your references to the widespread usage of the Miller and Hamada models, Mr. Pregozen claims that your argument rests on "unnamed people." Can you name some people who argue that it is better to stick with the Miller model?

A. Mr. Pregozen also adds that "Clearly, Brealey and Myers are not among them." At least with respect to Myers, this is both wrong and ironic. Wrong because Prof. Myers has previously advocated the use of a traditional Miller model WACC measure, and ironic because he has endorsed the Miller model specifically in the context of how cost of capital estimation methods should be used in utility rate setting cases.[10] Myers refers to the use of the Miller model for estimating the cost of equity capital in a rate context as "the straightforward approach."[11] He admits that there are probably "better approaches," but nevertheless advocates the use of the Miller model because it is simple, straightforward, and reasonably robust. In referring to the Miller model in the rate setting context, he states, "Only the most obvious, 'straightforward' approach was investigated

[10] Stewart C. Myers, "The Application of Finance Theory to Public Utility Rate Cases," *Bell Journal of Economics and Management Science* Vol. 3, No. 1 (Spring 1972).

[11] Myers, *op. cit.*, p. 94.

here. But this approach is logically sound and practical. By and large, the objections to straightforward approaches can be answered satisfactorily."[12]

Q. Can you give an example of an objection to the straightforward Miller model that Myers claims can be answered satisfactorily?

A. Myers is referring to the general objections to the M&M propositions, one of which, for example, is the assumption of equal and riskless borrowing costs.

Q. You argued in your rebuttal testimony that the "implications of the Miller model do not fundamentally change when we relax the assumption of equal borrowing costs." Mr. Pregozen dismisses this as an irrelevant attempt to change the debate. Do you agree?

A. Mr. Pregozen states earlier in his testimony that "both Modigliani and Miller and Brealey and Myers recognize [that] MMII can be modified to incorporate risky corporate debt."[13] It would appear that we have no difference of opinion on this, so his suggestion that I am "changing the debate from the ability of ComEd's Miller and Hamada models to accurately measure (sic.) the effect on the cost of common equity of changes in financial leverage to the *implications* of the Miller and Hamada models...."[14] by raising this issue is difficult for me to interpret.

Q. Do you have any further responses to Mr. Pregozen?

A. Yes. In criticizing my example of a situation where higher debt service burdens could lead to a higher expected return on equity in the presence of agency costs, Mr. Pregozen asserts that "common equity investors would rather a company waste a given amount on

[12] Myers, *op. cit.*, p. 94.

[13] Staff Exhibit 26, p. 5.

uneconomic interest payments than other uneconomic expenditures." He then states that "[t]he illogic of Dr. Culp's assertion is so clear that it requires no further explanation."[15]

I do not believe that our disagreement on this matter is central to the matter at hand, so I will not spend any length of time responding to it. I would simply say that disbursements made to security holders of a firm are hardly *un*economic if they are made in lieu of internal expenditures that *would be* uneconomic. Returning money to owners and creditors to a firm is anything but "uneconomic." I elaborate on how these "agency costs" can affect capital structure and the firm's risk management process in pp. 112-187 of my text *The Risk Management Process* (Wiley, 2001).

Q. Does this conclude your surrebuttal testimony?

A. Yes.

[14] Staff Exhibit 26, p. 10.

[15] Staff Exhibit 26, p. 12.